

January 16, 2006

Mr. Michael Coyle
Nuclear Energy Institute
1776 I Street, NW , Suite 400
Washington DC, 20006-3708

SUBJECT: Qualified Coatings Assessments

Dear Mr. Coyle:

As you are aware, the Nuclear Regulatory Commission (NRC) staff is currently engaging the nuclear power industry to resolve Generic Safety Issue (GSI) 191, "Assessment of Debris Accumulation on Pressurized-Water Reactor Sump Performance." An essential part of the GSI 191 analysis is the assessment of the coatings within containment. The purpose of this letter is to clarify the staff's position on the licensees' approach to assessment of qualified coatings within containment.

In order to address GSI 191, licensees need to estimate the amount of debris generated during a loss of coolant accident (LOCA) and account for debris transported to the emergency sump. This input will be used to evaluate existing sump designs and to determine if modifications are necessary. One of the potential debris sources is the coatings in containment. Currently, the sump analysis methodology assumes that the coating debris results from three sources: failure of all the coatings inside the LOCA jet Zone of Influence (ZOI), failure of all unqualified coatings outside the ZOI, and failure of all degraded qualified coatings outside the ZOI. The vast majority of containment coatings are referred to as "qualified" or "acceptable." Thus, an accurate assessment of the qualified coatings inside containment that are considered degraded is essential to determine the amount of coating debris that could result from a design basis accident (DBA).

While the staff has been aware of qualified coating degradation inside of containments, it has become of renewed concern due to GSI 191 sump debris issues. Recently, several plants have been found to have varying levels of degraded qualified coatings inside of containment for which the staff required remediation prior to restart.

These recent examples support our conclusion that there is no assurance that coatings inside of containment that are designated "qualified" when they are first applied will continue to meet qualification requirements for adhesion, etc., during normal plant operation over time.

During our meeting with the industry at Nuclear Energy Institute offices on June 30, 2005, we informed the industry participants that the NRC's expectation was that licensees would need to identify and institute a coating testing program to assure that previously applied coatings continue to meet the qualification standards necessary to assure they will not fail during a LOCA. In the absence of such a program, we said that all coatings inside containment should be assumed to fail during a LOCA and be available for transport to the sump.

The American Society for Testing and Materials (ASTM) has a standard for the periodic inspection of coatings (ASTM D5163, "Establishing Procedures to Monitor the Performance of Coating Service Level I Coating Systems in an Operating Nuclear Power Plant"). This standard only requires visual inspection of the coatings. Based on the fact that qualified coatings have failed at numerous plants, it is obvious that sometime during their service life, the coating properties, such as adhesion, will change and no longer meet the original qualification requirements. Thus, while a coating may visually appear sound, there is no assurance that the coating continues to meet adhesion and other qualification requirements that provide the assurance that the coating won't fail during a LOCA. At the June 30, 2005, meeting, industry participants were told that we did not find the ASTM standard for periodic visual coating inspection, by itself, sufficient to assure coatings continue to meet qualification standards, and that, if a licensee intended to use this standard, they would have to demonstrate how coatings that only have visual inspection assurance continue to meet qualification standards in light of current experience.

On July 25 and 26, 2005, NRC staff met with representatives of the ASTM, Committee D-33, Protective Coatings for Power Generation Facilities. The intent of the meeting was to discuss changes to ASTM standards that would be necessary to demonstrate that qualified containment coatings remain capable of meeting their original qualification requirements. Current ASTM guidance relies heavily on visual assessment, as described above. During this meeting, the staff restated its position to the ASTM that the current guidance does not adequately demonstrate that qualified coatings continue to meet their original qualification criteria. A summary of this meeting is available under the Agencywide Documents Access and Management System Accession Number ML052280348.

It is our understanding that ASTM does not intend to develop more rigorous inspection and testing methods and criteria to assure qualified coatings continue to meet their qualification requirements. We have recently asked the NRC's Office of Nuclear Regulatory Research to develop inspection and testing methods capable of providing assurance that qualified coatings remain in compliance with qualification requirements. However, this is a long term research effort that is not expected to provide useful guidance in the short term.

In summary, in order to demonstrate the adequacy of either existing sumps or any sump modifications made as part of the GSI-191 resolution, licensees will need to either:

- 1.) Demonstrate the adequacy of visual examination alone to assure that coatings originally designated as qualified remain in compliance with the qualification requirements,
- 2.) Propose an augmented inspection and testing program that provides assurance that qualified coatings continue to meet qualification requirements (e.g., adhesion under LOCA conditions), or
- 3.) Assume all coatings inside of containment (qualified and unqualified) fail under LOCA conditions and become available for transport to the sump (note that a licensee might still demonstrate that failed coatings do not transport to the sump based on plant-specific conditions such as flow velocities).

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Given the potential impact of non-adherent qualified coatings on emergency sump performance, the NRC staff believes it would be advantageous for the industry to develop a standardized approach to assess qualified coatings that goes beyond visual inspection. Any approach should include an assessment methodology that is correlatable to the original DBA qualification testing.

If you would like to discuss this request further, please contact me at (301) 415-1274.

Sincerely,

/RA/

Brian W. Sheron, Associate Director
for Engineering and Safety Systems
Office of Nuclear Reactor Regulation

cc: Jon Cavallo, ASTM D33

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